REPORT OF THE COMMITTEE

ON

OUTDOOR LIGHTING

COMMITTEE

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ABSTRACT OF REPORT

Your Committee has divided their report into the following headings:

Commercial Outdoor Lighting.
Business District Improvement Lighting.
High Pressure Lighting.
Municipal Street Lighting.

Under the heading of Commercial Outdoor Lighting we have included Sales Plans, Maintenance, Installation, Co-operation between Manufacturers of Lamps and Gas Companies, Lamp Efficiency, Flat Rate Lighting, Outdoor Gas Lighting in Combination Companies.

We have attempted to point out the reasons why outdoor lighting has not been developed as much in the past as the possibilities warrant, and to point out the methods that must be adopted in order to secure the maximum possible outdoor lighting business.

The reasons given for the slow development of outdoor lighting business in some cities are (1) the lack of aggressiveness in soliciting the business; (2) the lack of forethought; installing the lamps in a temporary manner without thought of permanently holding the business, and (3) the lack of efficient maintenance.

Your Committee is of the opinion that outdoor store lighting can best be secured and held by selling lamps to the consumer payable in monthly installments over a period of from one to two years. We are of the impression that this plan appeals to the merchant and is best for the gas company because it develops in the consumer an interest in the lamps through his ownership or part ownership of them and as a result he is not

REPORT OF THE COMMITTEE ON OUTDOOR LIGHTING

Your Committee on Outdoor Lighting, appointed by your President, submits the following Report for your consideration and discussion:

Prior to the introduction of the electric arc in 1880, outdoor lighting was done almost exclusively by means of gas lamps. Open flame lamps of ten to twenty candle-power, used singly and in clusters, were supplied by the local gas companies and maintained under contracts, usually of long terms, with municipalities. As cities grew in size, the demand for greater street illumination increased, in order that industrial activities could be prolonged after night-fall.

When the electric arc was introduced, open flame gas lighting was rapidly displaced in the lighting of principal business streets, by reason of the greater intensity of the new illuminant. Competition between gas and electric companies for street lighting became very keen, but owing to the lack of a gas unit equal in intensity to those operated by the electric companies, gas street lighting became largely confined to residential districts.

This field in turn became endangered by the subsequent introduction of incandescent electric lamps of sixteen and thirty-two candle-power. In competition with these units, the open flame gas burner was at a serious disadvantage, and by reason of having to materially increase the unit gas consumption, to produce larger flames and higher candle power without a corresponding increase in revenue, street lighting ceased to be profitable business for gas companies.

The introduction of the incandescent mantle wrought many changes in street lighting conditions. It regained for gas much of the business which had been lost, and soon began to cause an increase in the number of gas units employed. By its use it was possible to increase the luminous efficiency of gas more

than threefold, and as the consumption of gas or current is the largest item in the cost of operating outdoor lighting units, the efficient incandescent gas mantle has become the chief competitor of electricity for outdoor lighting.

Commercial Development also brought about a demand for increased lighting in those districts where stores were located. As a result, there is a demand today for three forms of outdoor lighting: (1) Commercial or Store Front Lighting, (2) Business District Improvement Lighting and (3) Municipal Street Lighting. The use of gas units is possible and practical for all these forms of outdoor lighting.

COMMERCIAL OUTDOOR LIGHTING

Under this heading are placed those lamps installed in front of stores, churches, meeting halls, amusement parks, tennis grounds, signboards, train sheds, docks, piers and alleyways. There are manufactured today lamps which are capable of doing this class of lighting in a thoroughly practical, efficient, pleasing and economical manner and the consensus of opinion among the members of your Committee is that it is one of the most valuable forms of business that Gas Companies can secure, for it does not displace other forms of gas lighting but is entirely new business and is one of the best forms of advertisement for the Gas Company. The public seldom sees gas ranges, water heaters, gas engines, industrial fuel appliances or many of the other gas appliances in operation as they pass through the streets, and if they do they have no means of estimating the efficiency of the appliances.

The same is true of residence lighting which is not generally exposed to the public view. Interior store lighting is largely exposed to the view of the general public and plays an important part in demonstrating the quality and value of our product, but not as much so as is the case with outdoor lighting, for one can scarcely ride through a city on a fast express train without forming some impression of the local gas service from the observation of the exterior lighting.

It is doubly important that outdoor lamps be properly main-

tained, for all that has been said in favor of the outdoor lamp as an advertising medium for gas is reversed where they are neglected or allowed to get out of order, for they are then a detriment.

Your Committee has spent considerable time and energy in collecting photographs of various installations of outdoor lamps which they have carefully gone over and discussed as to the good and bad points of such installations and have sent numerous circular letters to Gas Companies throughout the country.

The following is an abstract of eighty replies received from these letters:

Do not handle outdoor gas lamps of any kind	12
Install and maintain outdoor lamps for consumers for a monthly rental	34
Sell outdoor lamps to consumers	26
Companies both selling and renting lamps	8
Total	80

The following table gives an idea of the monthly charges made by those companies who rent lamps to consumers, the rentals given including maintenance:

1	Company	furnishes	and	maintains	lamps	free.		
5	Companies	rent	and	maintain	lamps	@	25c.	per lamp.
2	"	"	"	"	"	@	35c.	"
1	"	"	"	"	"	@	45c.	"
18	"	"	"	"	"	@	50c.	"
4	"	"	"	"	"	@	75c.	"
3	"	"	"	"	"	@	$1.00	"

The average rental and maintenance charge is 51c. per lamp per month and of this amount approximately 35c. is credited against the cost of maintenance and 16c. against the depreciation on the lamp. Sixty-eight of the companies who have made reports to your Committee, supplying a total population

of 4,458,000, have in use 9,209 outdoor lamps. The average rate for gas in these cities is about $1.00 per M cubic feet and electricity is sold at an average of approximately 10c. per kilowatt hour. In reviewing the reports which we have received, the Committee has formed the opinion that neither the location or size of a city or the cost of gas or electricity has much bearing on the number of lamps that can be put in service.

The best average reported is from a company operating in a small town in New Jersey having a population of about 6,500, which has in use 125 outdoor arc lamps. This is not a summer resort town. Comparison between the outdoor lamps in use and the population shows that there are in use an average of 19 outdoor lamps to 1,000 inhabitants. If it were possible to secure these results in all of the 68 cities previously mentioned as having a population of 4,458,000, the total number of outdoor arc lamps installed in these cities would amount to 84,702, as compared to the 9,209 actually reported in service.

The second city in point of the number of arc lamps in service compared to the population is a city of 57,000 inhabitants in the extreme South, which has 900 outdoor lamps, or 16 lamps to every 1,000 inhabitants.

The third best result reported is a city in the extreme Northwest, with a population of 82,500, which has in service 988 outdoor arc lamps, or 12 lamps to every 1,000 population.

A city in the middle South, of 36,000 inhabitants, with 300 lamps in use, or 8 lamps to every 1,000 population, stands fourth in the list in results secured.

The fifth best report is from a city in the Southwest, with a population of over 600,000, having an installation of 2,025 outdoor arc lamps in service, or a trifle over 3 lamps to every 1,000 inhabitants.

The cities referred to above are scattered over a wide range of territory, reaching from the Atlantic to the Pacific Coast and from the North to the South. The following table will give some idea of the terms on which the lamps were installed,

the maintenance charges and the comparative price of gas and electricity:

	No. 1	No. 2	No. 3	No. 4	No. 5
Population	6,500	57,000	82,500	36,000	600,000
Outdoor Arc Lamps	125	900	988	300	2,025
Sell	Yes	No	No	No	No
Rent	Yes	Yes	Free	Yes	Yes
Rental price per month (including maintenance)	50c.	50c.	Free	25c.	$1.00
Maintenance charge per month for lamps owned by consumer.	25c.	...	....	...	....
Price of Gas per M c.f.	$1 00	$1 20	$1.15 to .60	$1.00	80c. to 60c.
Price of Current per k.w.h	10c. to 4c.	7c.	6c. to 2c.	10c.	4c. to 2c.

It will be seen from these figures that the greatest number of outdoor lamps are not installed where the rate on gas is low and the rate on electricity high. From the information which has been supplied the Committee has formed the opinion that a greater number of outdoor arc lamps are installed where the electric competition is keen, as greater effort is exerted by the gas company to secure this business as a result of this competition.

SALES PLANS

It is impossible to lay down a set rule by which to secure the outdoor gas lighting business. There are two general plans on which lamps are installed: (1) the renting of the arcs, and (2) their sale to the consumer.

There is considerable difference of opinion among the members of your Committee on the subject of whether it is best to sell or rent lamps to consumers, and we have spent considerable time in discussing the merits of each plan. The figures which we have seen on the results that have been secured would seem to indicate that the more liberal plan of renting arcs results in installing more lamps, as generally the

cities which report the best results in the number of lamps in service use this plan. It has advantages in that it gives the gas company control of the maintenance of the lamps, as they are owned by the company, and thus insures against neglect and inefficient service. The rental plan makes up largely for an inefficient selling organization.

The final conclusion we have reached is that with a properly trained organization of men it is better to sell the lamps on long-term payments, these payments including maintenance. This plan has the advantage, from a business-getting standpoint, that the consumer is not required to make any large payment at one time; also while he is paying for the lamps the gas company is maintaining them, and there seems to be an advantage in having the consumer understand he is paying monthly for something he will own himself when his payments are completed. It has a tendency to keep the customer interested so that he will continue to use the lamps, and he is not so open to the arguments of the salesmen for competing illuminants. The expense to the gas company for removals and changes is kept to the minimum.

Success in the sale of gas for outdoor illumination, however, is not based upon the sales plan, but upon the effort which is expended in going after the business. It is a class of business in which the gas company directly meets competition from electricity, and it is necessary in order to be successful to employ men capable of explaining to the consumer the merits of gas for exterior lighting; capable of combating the arguments of competitors, and primarily men who understand wherein lies the value of outdoor gas arc lamps to the consumer.

We suggest that you choose from among your salesmen one or more men who will make a study of the advertising value of store-front lighting from a merchant's standpoint, bringing to their attention how brilliant lighting attracts the public, for a study of conditions in any situation will clearly prove that the public goes where there is the most illumination. It is essential that they be men who are competent of going after

the better class of business, for if you can secure business of this kind in the better stores, the smaller stores will imitate the larger ones.

It is difficult to get the merchants with the better class of stores to install lighting if they have only seen it used in front of the poorer stores, and there installed in the cheapest manner. An installation in front of a bank, hotel or large store will do much to add value to your product and encourage others to adopt it. Frequently a sketch or drawing of the store front, showing it illuminated with the lamp that you are selling, makes a forceful argument in going after business.

The first hundred lamps are the hardest to put out, but if you have installed such a number in a proper manner, giving them the proper care and maintenance, assuring yourself that the installation is artistic and the illumination satisfactory, the balance of the business comes easier.

An enthusiastic and energetic campaign for outdoor lighting will bring you results. You can educate the merchants of your city to consider the necessity of lighting the exterior of their stores, just as much a part of their store equipment as the installation of lights in the interior.

It is important, whatever plan you adopt, whatever method you pursue to secure outdoor lighting business, that it be based on principles that will make the installation stick; that will not only give you satisfied consumers, but will aid you to secure additional business. The installation should be a credit to the merchants, to the city and to the gas company.

It seems to be the tendency, because of the advertising value that is attached to exterior lighting, to attempt to be too spectacular. Securing a new installation of outdoor lighting, regardless of what it costs, taking a photograph of the same and sending it to a trade journal, is not necessarily good business if the installation is not practical or permanent. Do not overdo a good proposition by putting in more lamps than are necessary. To do so looks bad from an artistic point of

view and cheapens the appearance of your installation. Remember that if you do install lamps and they are not used, they are a detriment to your company, for they are a bad advertisement. To get and hold outdoor lighting business the effect must be pleasing to the eye.

MAINTENANCE

The following table shows the charges for the maintenance of lamps by those companies from whom we received data where the lamps are owned by the consumer:

17	companies	charge	25c.	per	lamp	per month.
5	"	"	35c.	"	"	" "
1	company	charges	40c.	"	"	" "
11	companies	charge	50c.	"	"	" "

The average maintenance charge is 35c. per lamp per month.

While it is impossible for the Committee to go into the cost of maintenance on account of the different types of lamps sold and the difference in localities, a factor which has a bearing on the cost of the maintenance, also the size of the cities, as it is known to cost more to maintain lamps in large cities than in small towns, it appears the average charge of 35c. per lamp per month represents about the actual cost of this maintenance to the gas company.

It is the unanimous opinion of your Committee that under no circumstances should outdoor arc lamps be installed for consumers unless the gas company is prepared to maintain them, making regular inspections and supplying the necessary mantles, glassware and miscellaneous material. While this is apparently true of all forms of commercial lighting, there are several reasons why the maintenance of outdoor lamps requires more care and is more important than the maintenance of indoor lamps; the first and most important being that the lamps are exposed to the weather and the wear and tear on them is the greatest; second, the merchant is more liable to neglect the outdoor lamps, as the illumination they give is not

absolutely necessary, while artificial illumination is essential in the interior of the store, and the merchants themselves will make some effort to keep the indoor lamps in working order; and third, being exposed to the public view, when out of order they give very adverse publicity to the service which the gas company is giving to its consumers.

In our opinion there is nothing in the way of negiect of gas appliances that can do as much injury to the business as outdoor arc lamps that are neglected. We believe it to be a good business principle for a gas company to redeem lamps for customers, junking them if necessary rather than allow lamps to hang in front of stores on the business streets with broken globes, dirty globes, without mantles, or otherwise in a condition where they cannot be used, even though it were desired.

INSTALLATION

It is noticeable in inspecting the installations of gas arc lamps in various cities of the country that mistakes have been made in the past in installing outdoor lamps in front of stores without apparent thought to the appearance of the installation or the size of the pipe necessary in order to give a good supply of gas. We have seen, we regret to say, in many cases outdoor arc lamps installed at prominent store fronts which are supplied by ⅜-inch pipe extended over the sidewalk at various distances of from three to ten feet. Sometimes additional support is given to the lamp by drawing two strands of plain steel wire from the back of the lamp and fastening the wires to the building wherever it is convenient to do so, the wires being twisted to any shape in order to complete the job in the easiest and quickest manner. In some of these jobs no thought has been given to the sagging of the lamps or the pitch of the pipes necessary to prevent traps. In many cases the piping is not painted to prevent rust.

We all know that many installations of this kind have been made, and we also know that the result has been that many

lamps so installed have been taken down, even though the lighting itself was satisfactory to the merchant, but was discontinued simply on the appearance of the installation, particularly in the daytime.

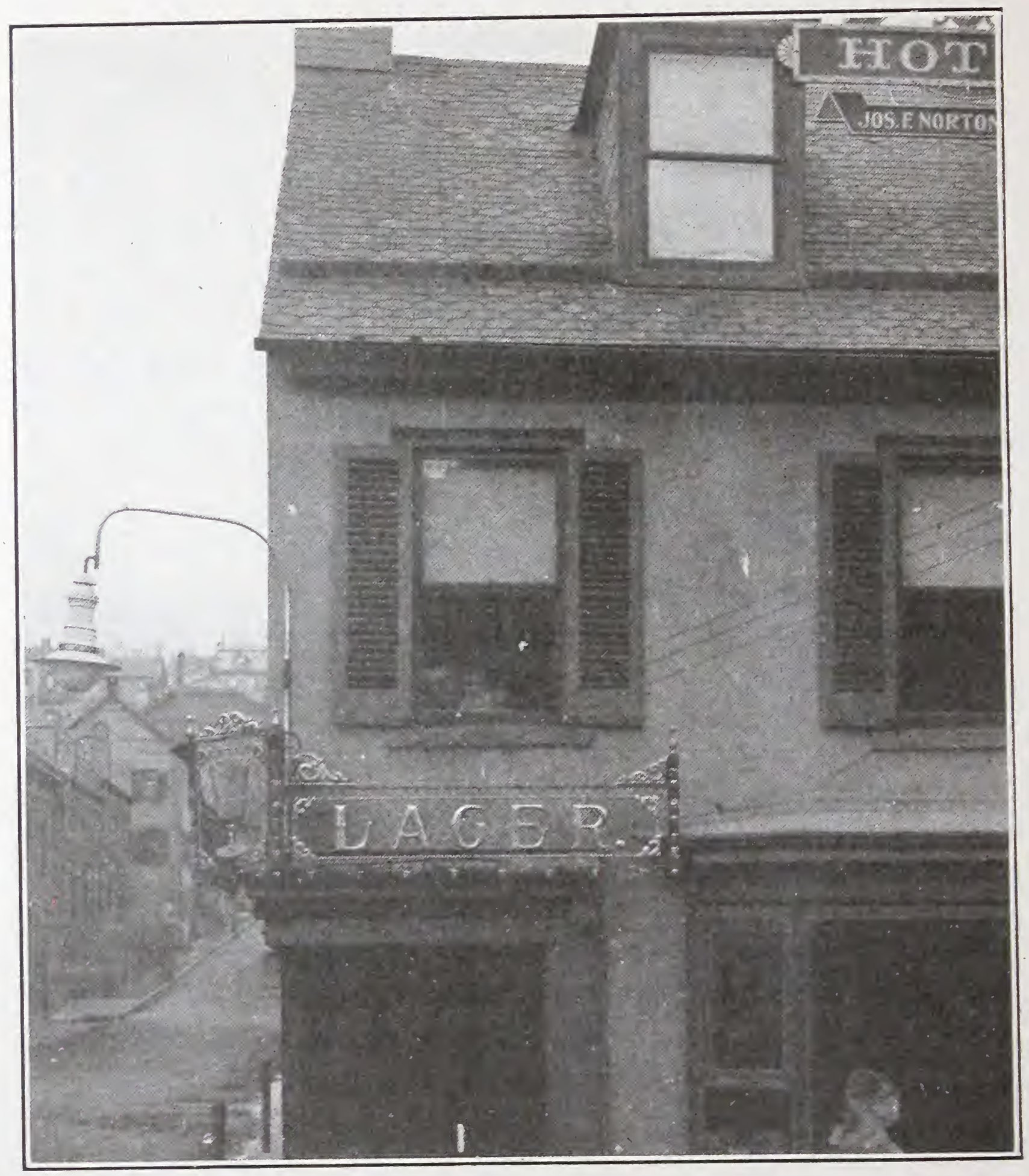


Figure 1.

In Fig. 1 is given an illustration of an outdoor arc lamp installed in front of an old-fashioned corner saloon.

While possibly, when this lamp was installed, the thought was that the piping job was in keeping with the surroundings,

it should be remembered that such unsightly piping jobs are seen by the passing public and do much to discredit outdoor gas lighting. It has long since been proven that piping to outdoor lamps should never be less than ¾ inch, preferably 1 inch or 1¼ inch. It is essential that the piping be neat in appearance and that pockets and traps be avoided, and also that all piping be neatly painted after its installation.

Your Committee is of the opinion that we are far from taking advantage of the possibilities for exterior gas lighting, and if we could trace the lack of results in certain cities to any one particular factor it would be the unsightliness and impracticability of the piping installations that have been made. We say that more business has been lost through the unsightliness of the installations than any other one factor. Gas arcs are unquestionably an efficient unit for exterior lighting and they can be installed in a proper manner. It has been clearly proven that companies have been able to secure outdoor lighting business by adopting and following the policy of good installations and have thus built up a permanent business.

Occasionally a class of architecture will be found that does not permit of any lighting on the exterior of the building, but there should be nothing in this to discourage you, for there are hundreds of other buildings that do permit of piping without detriment to their appearance.

Your Committee therefore recommends that all outdoor arc lamps be hung from neat and artistic looking piping or brackets. In front of the more ordinary stores an inexpensive bracket or pipe is perfectly satisfactory, while with the best class of buildings the fixtures should be designed with the principal idea that of an ornamental installation, with price the factor to be least considered. Between the two classes of stores, the best and the poorest, fixtures should be graded to suit the architecture of the building and the nature of the business.

Fig. 2 illustrates the front view of the First National Bank of Scranton, Pa., showing an installation of two 5-burner

outdoor arc lamps. These lamps are installed on solid cast-bronze brackets which cost the consumer $255 each. The ventilators of the lamps are covered with special perforated bronze castings and the entire installation is designed to harmonize with the architecture of the building. These lamps have been in use for three years, being lighted every night,

Figure 2.

and have become a familiar landmark to the residents of Scranton.

The exterior of the Dime Savings Bank of Scranton is shown in Fig. 3. The front of this building is illuminated by ten 5-burner outdoor arc lamps, installed on special designed fixtures which cost $65 each. Installations of this kind produce definite results, as is clearly proven by observing the business places in the city of Scranton. There are many hundreds of outdoor gas arc lamps in use in Scranton, all of

Figure 3.

which have been installed in a manner in keeping with the buildings.

The exterior of the Jefferson Hotel in St. Louis, Mo., is illuminated in front with twenty-seven 5-burner outdoor arc lamps that have been in actual use during the past two years.

Fig. 4 illustrates a prominent corner in Portland, Ore., illuminated by outdoor gas arc lamps.

Figure 4.

In Fig. 5 is shown a prominent hotel equipped with twenty-eight 5-burner outdoor gas arc lamps.

Fig. 6 illustrates a summer garden illuminated with gas arc lamps on ornamental posts.

Figure 5.

Fig. 7 gives an example of signboard lighting by means of gas.

Figs. 8 and 9 show day and night views of outdoor lighting by gas arcs in front of a hotel.

Figure 6.

Figure 7.

Figure 8.

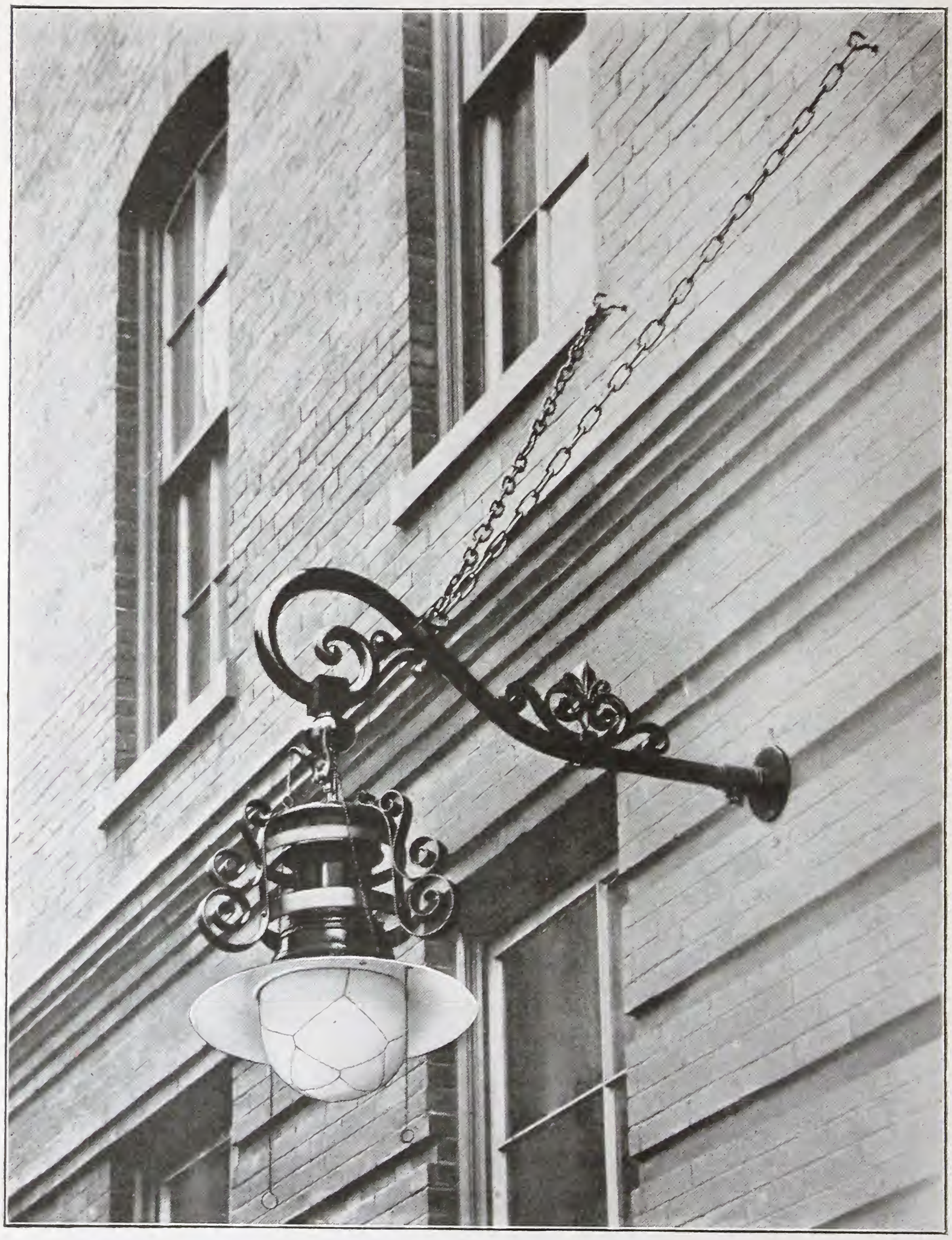
Figure 9.

OUTDOOR GAS ARC LAMP EFFICIENCY

The reason for the high efficiency of the inverted gas arc lamp is the natural downward direction of the light rays. It does not seem to be generally known or recognized that gas arc lamps properly constructed show a decided increased efficiency over the usual single-mantle lamps. This increased efficiency appears to be the result of bringing the air down through the heated top of the lamp over the top of the globe to the mantles, together with the fact that the gas and primary air to the bunsen are heated before they reach the point of combustion. The increased efficiency of the gas arc lamps when heated is readily observed, as from the time they are first lighted they will continue to increase in efficiency until the lamp is thoroughly heated to the highest point of temperature obtainable.

It is also noticeable in laboratory tests that the 5-burner gas arc lamp is more efficient than the 3-burner lamp of the same type, other conditions being equal. This results from the greater amount of heat due to the burning of a larger amount of gas.

The success or failure of the outdoor gas lamp lies between the manufacturers of the lamps and the gas companies. While it is fairly easy to construct a gas lamp that will work satisfactorily indoors, this is not the case with the outdoor lamp, and many gas men do not fully appreciate this fact. A gas lamp, in order to give the best results, must be fully vented, and in the case of the outdoor lamp this becomes a difficult thing to do, as at the same time the construction must be such as to withstand all weather conditions. One of the difficulties encountered is securing a metal that will withstand the weather. The gas globe is subjected to great heat from the interior, and the rain and snow striking the exterior results in a greater breakage than is the case with the indoor lamp. The lamps are constantly being jarred by strong winds, and this, of course, has a tendency to break mantles.



Bent Iron Pipe Bracket and Scroll Top Piece for Outdoor Arc.

Manufacturers of outdoor gas arc lamps must try to give the gas companies the lamps that will stand up and give the service which the customers of the latter require. The gas

company should give the manufacturers of the gas lamps the benefit of their advice and the details of conditions wherein the lamps do not prove successful in order that the manufacturer can build lamps to successfully meet the conditions.

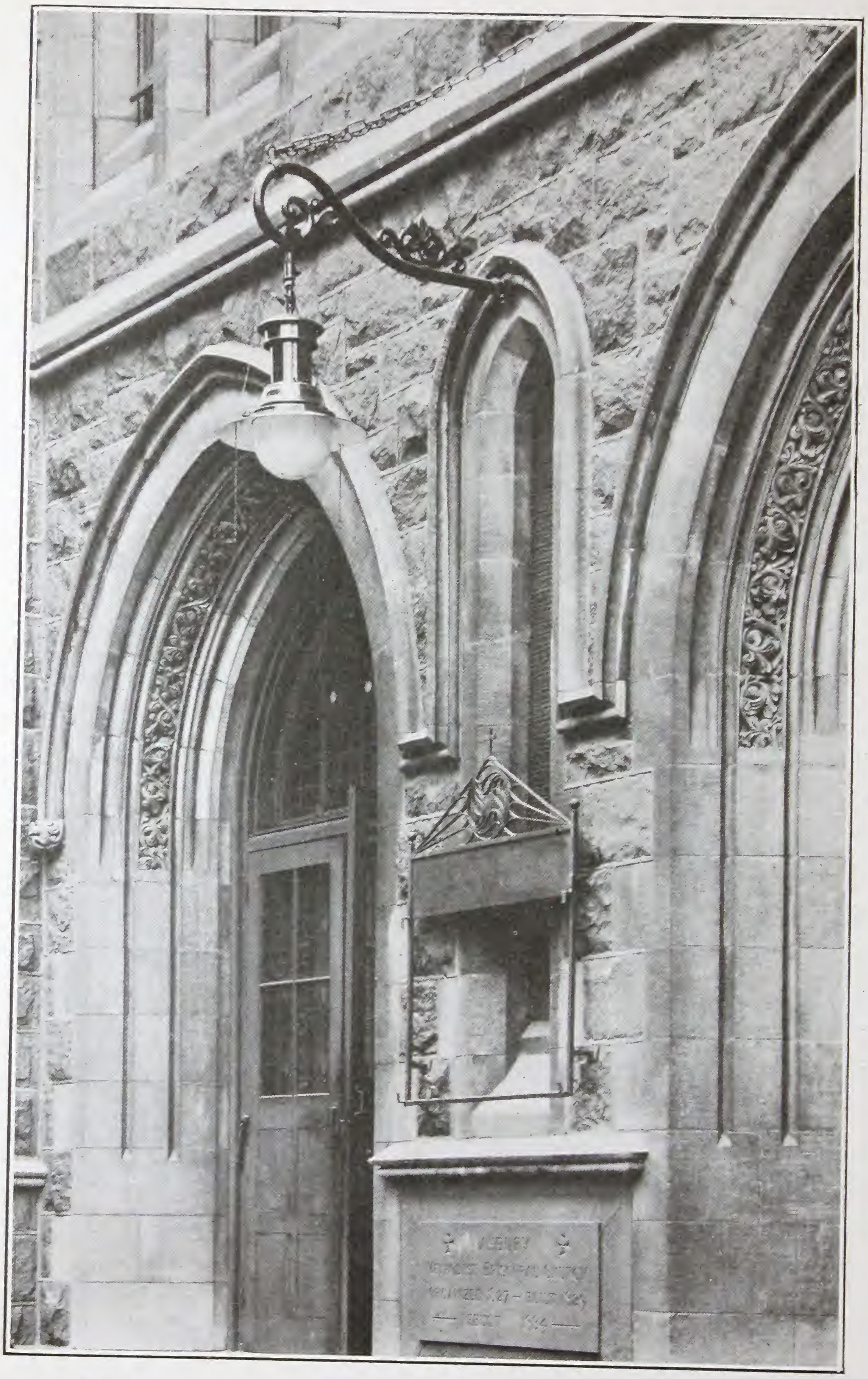
One of the improvements that would aid materially in the sale of outdoor gas lighting would be a glass globe that will withstand almost any weather conditions, but until such glass is furnished we recommend the use of wire guards. A more reliable pilot light, or some other means for positive igniting and extinguishing, are necessary; also some means for positive distance control. The manufacturers realize what is needed along this line, and it is their hope that they will develop something that will meet these conditions in the near future. The lamps we are selling at the present time have proven commercially satisfactory, but this is no reason why we should not recognize that there are possibilities for improvement. We should strive to develop improvements that will overcome any of the difficulties now encountered.

It has been suggested by one of the Committee that there is a field for a single-mantle lamp having a large mantle of about the candle-power of the 3-burner inverted arc lamp. This is open to question, but it is hoped that something will develop along this line that will enable the value of the suggestion to be proved or disproved.

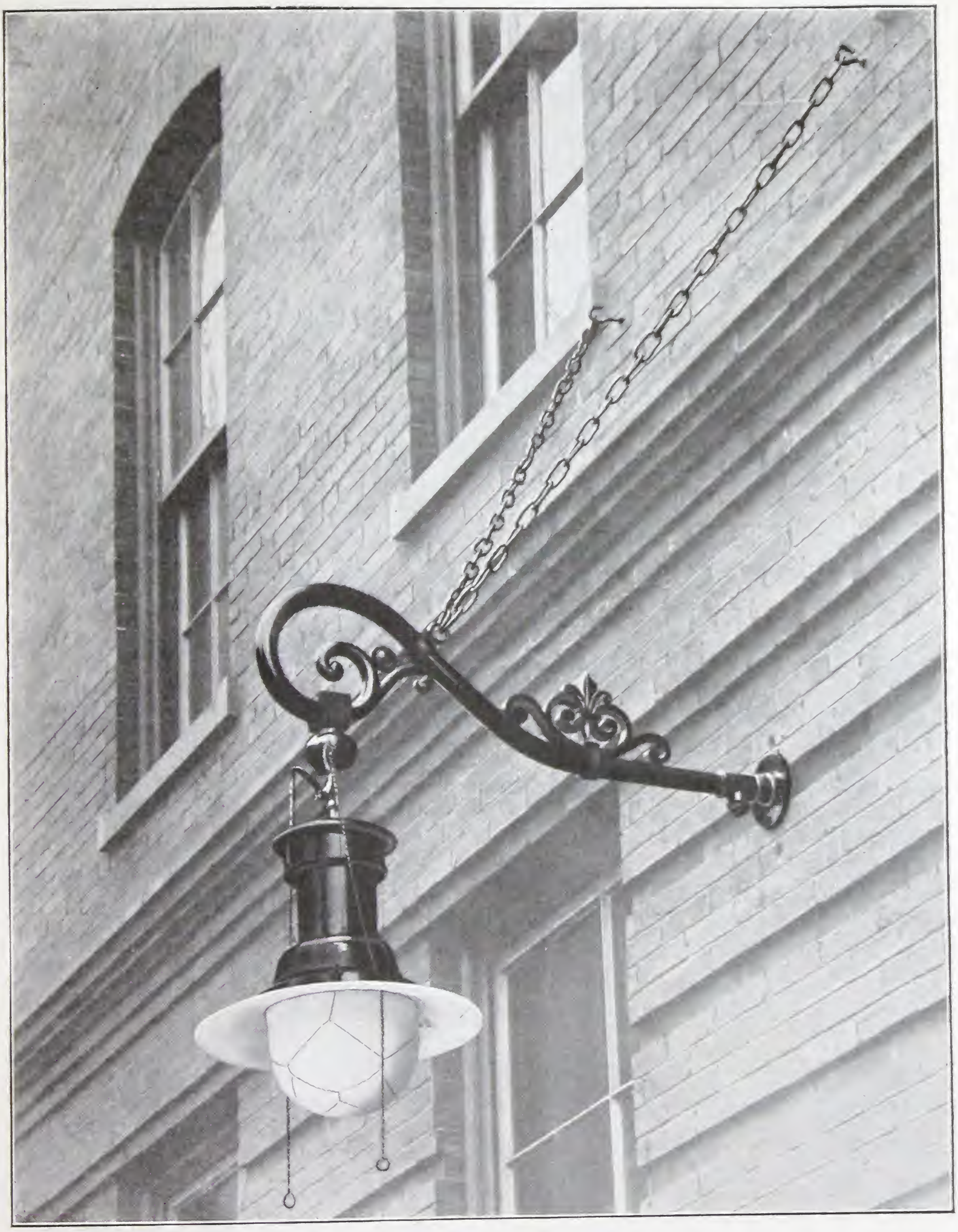
There is unquestionably a need for a compact, artistic looking single burner outdoor gas lamp for residence porch lighting, preferably, of course, one that can be controlled from the interior of the house. It is conceded that electricity has advantages for some forms of decorative lighting, but where good illumination is required there is no reason why gas should not successfully compete and, if sufficient energy is expended, secure the bulk of this business.

FLAT-RATE LIGHTING

Only three of the companies who reported to your Committee stated that they were placing lamps on a flat-rate basis.



Bracket shown on page 25 installed in front of a church.



Bent Iron Bracket for Outdoor Arc.

However, these three reports seem to show that it is a very good plan on which to install outdoor lamps. A customer will oftentimes agree to pay a stipulated price per month for a certain number of hours' lighting, where he hesitates when gas is sold to him through the meter, and in the latter case there is often a tendency to economize. After the lamps are installed on a flat-rate plan the consumer knows exactly what he must pay per month; the lighting and extinguishing of the lamps is out of his hands and a stipulated income per month is assured to the gas company. The gas, in the cases that have been brought to our attention, is metered and placed on the books of the company at the regular rates. By so doing it enables the gas company to keep a check on the amount of gas the lamps are consuming and the profit that results from their installation.

HIGH-PRESSURE LIGHTING

It is well known that increased efficiency is gained by the use of high-pressure lamps. There is no doubt but that this method of lighting will find a permanent place in the commercial outdoor lighting of the future. To date, however, most gas companies of this country appear to have regarded it as more or less in the experimental stage.

From a commercial standpoint the disadvantages have been: (1) the cost of the special equipment necessary to increase the pressure and the upkeep of the same, and (2) the high cost of maintenance. When these expenses are taken into consideration the opinion of many of those who have tried this form of lighting is that there is little efficiency gained per dollar expended.

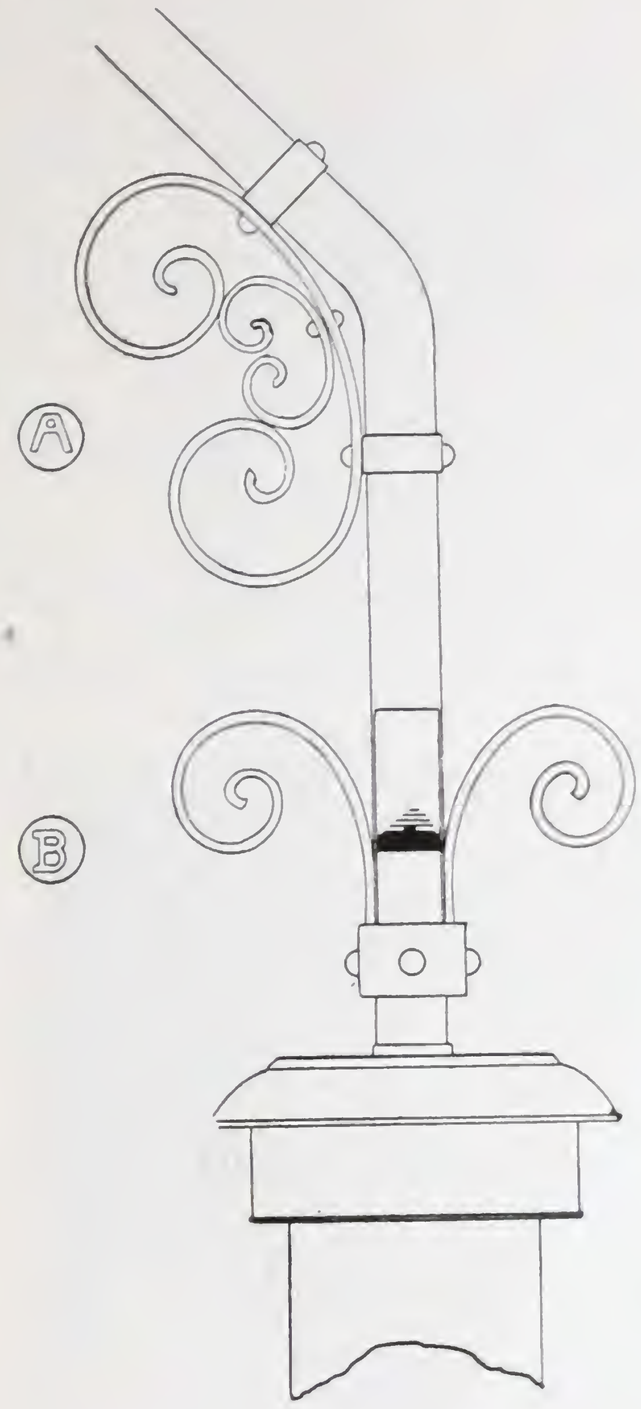
In Europe, where special pipes have been laid for street lighting and the gas is delivered under high pressure, there seems to be a great future for this type of lamp. In America several companies who have high-pressure distribution systems have installed high-pressure street lamps along their mains with satisfactory results.

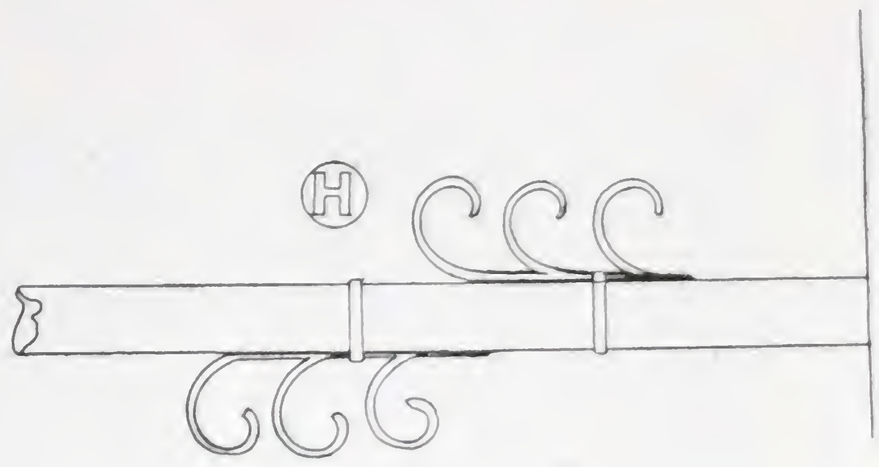
The Outdoor Lighting Fixtures of a Bank.

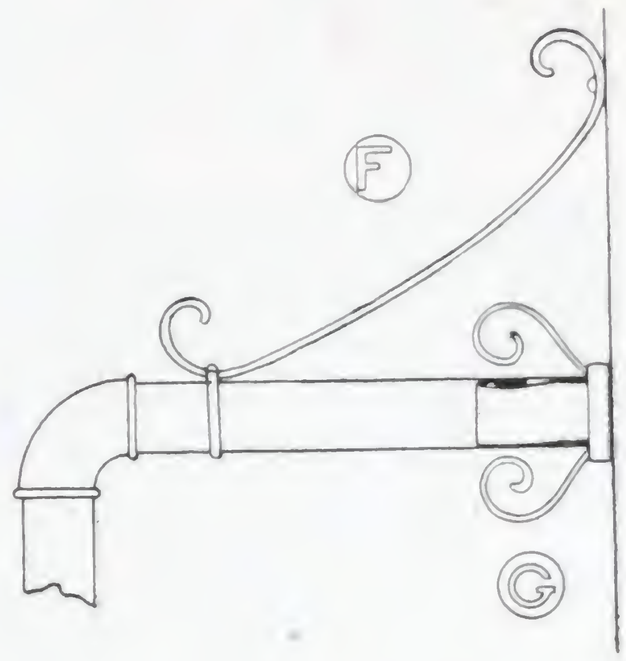
COMBINATION COMPANIES

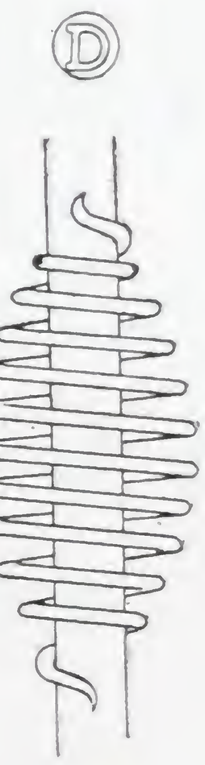
It is noticeable from the reports received from combination companies that they have few outdoor gas arc lamps in use, and some frankly state that they sell only electricity for outdoor lighting. This is a mistake, as in almost any city where there is a combination company instances could be cited of streets that are almost barren of any outdoor lighting. It is impossible for any company to secure all the available exterior lighting by means of electricity, and there is no reason why that business which combination companies cannot secure with electricity, if they are pushing the latter commodity, should not be solicited to use gas. To do this would not interfere with the electric business, but, on the contrary, has a tendency to educate merchants to the advantages of illuminating the front of their stores, and such education will bring results to the electric as well as the gas end of the business of the combination companies.

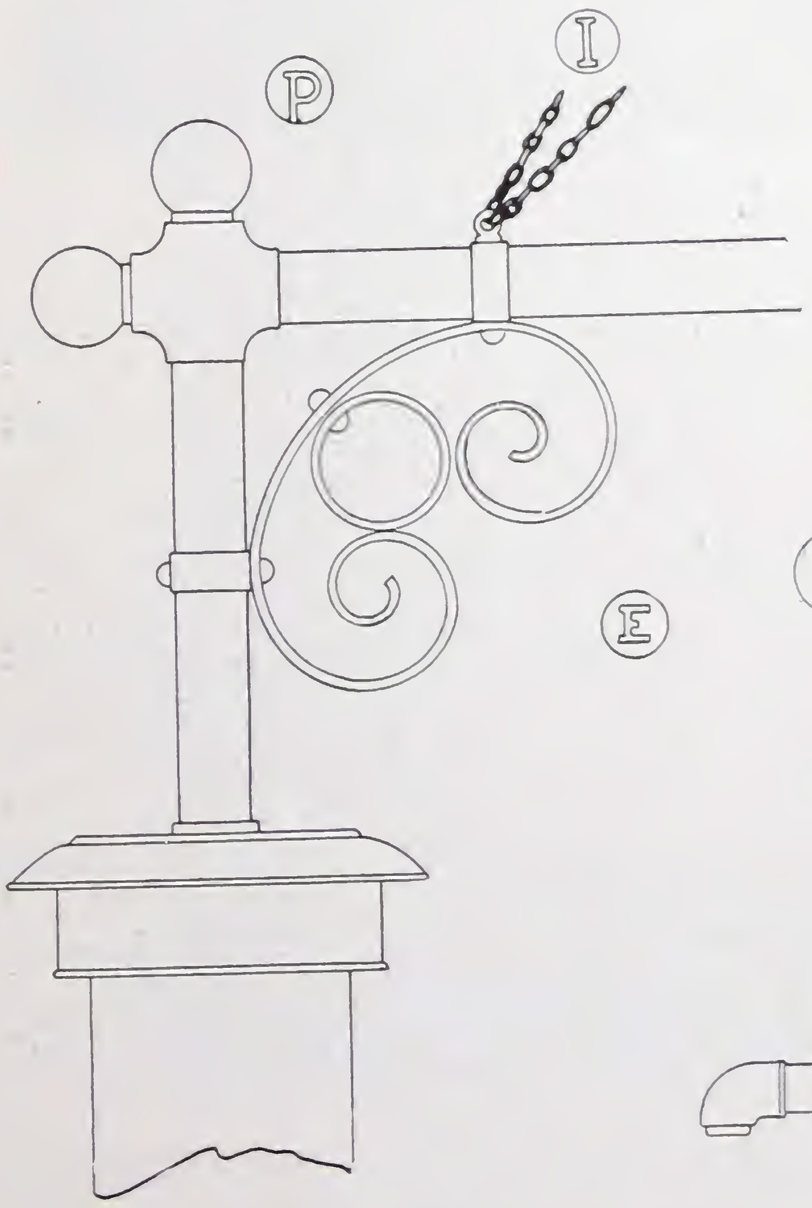
Exterior Store Lighting by Gas Arc Lamps.

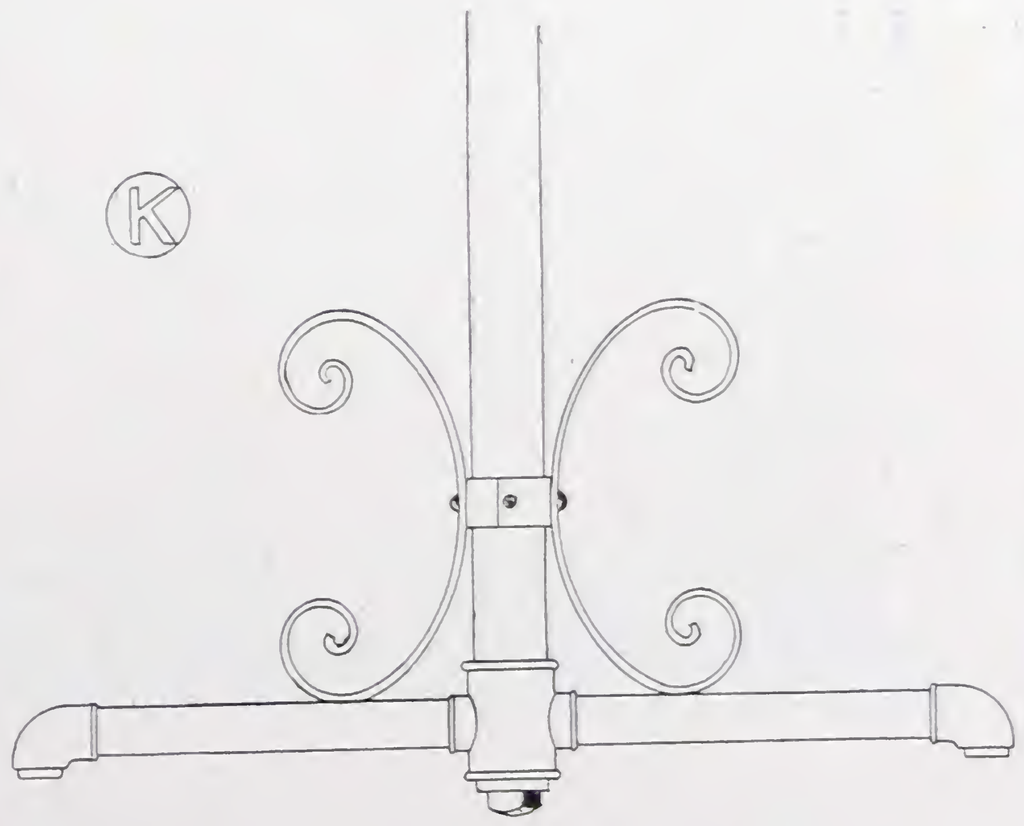












Ornamental Bent Iron Pipe Scrolls for Outdoor Arcs.

BUSINESS DISTRICT IMPROVEMENT LIGHTING

Figs. 11 and 12 show illustrations of district improvement street lighting by means of gas arc lamps.

The lamps, as you will note, are suspended from ornamental posts, as is the case with most lighting of this kind.

This is difficult business to secure because: (1) the electric companies are particularly anxious to secure it, and make

Figure 11.

low rates if necessary because of the long burning hours, and (2) it is necessary to do business with a number of individuals in order to secure the contract.

The first step, however, is educating the merchants to the advertising value of an installation of this character. While it is true that at the present time a great deal of this lighting is being paid for by municipalities, as a general thing the first installation was made by the merchants in the district, and later the municipality has taken the responsibility for it at the request of the merchants and the system has been ex-

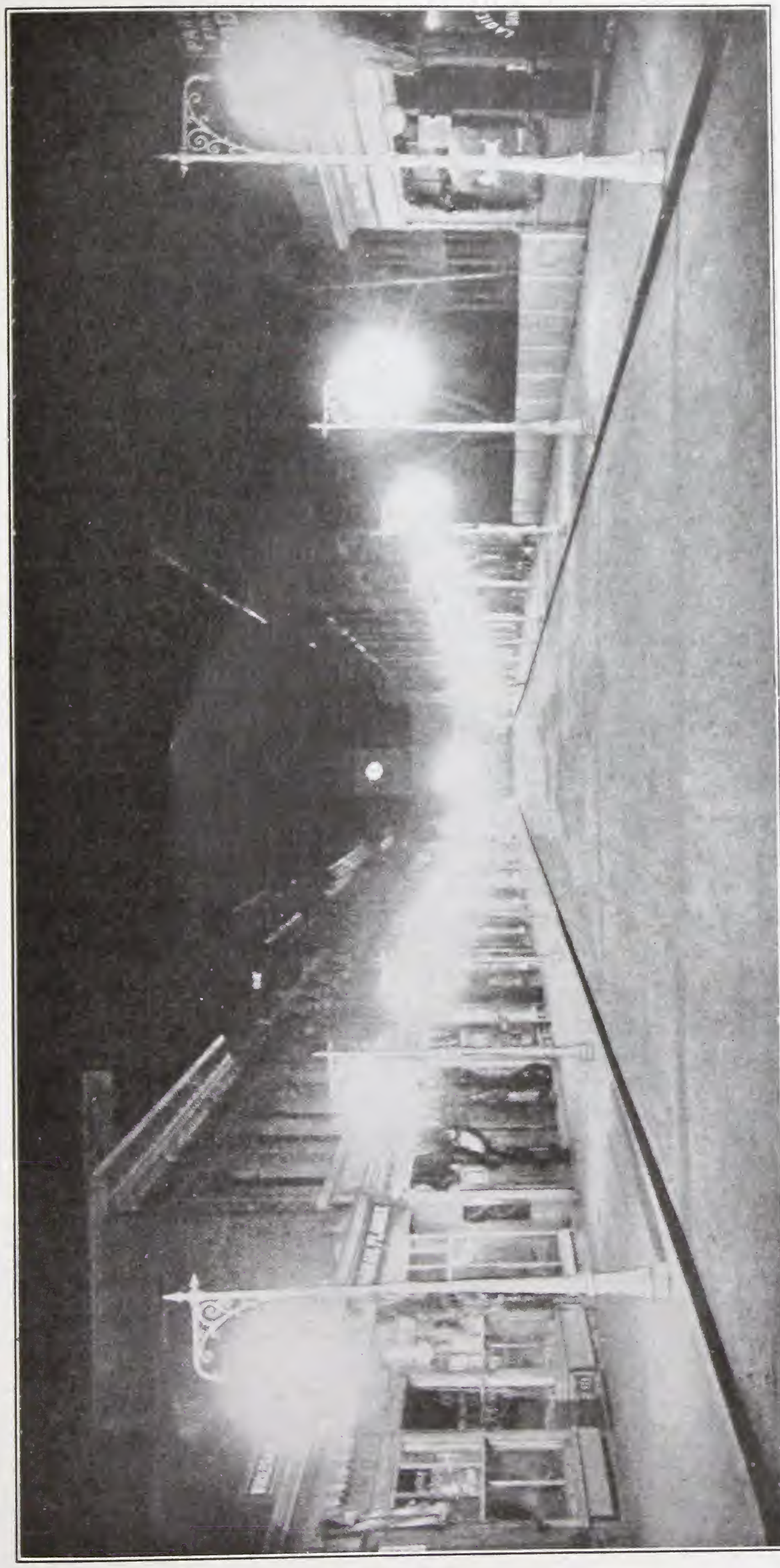


Figure 12.

tended to other parts of the city. Frequently the cost of the lighting has not materially increased the lighting costs of the city, but has to a certain extent replaced the electric arc lamps formerly used for street lighting in these districts.

Electric lighting of this kind is generally done by electric companies by means of the small candle-power lamp, and they have educated the public to expect an ornamental system of lighting rather than good illumination; in fact, it is generally spoken of as "ornamental street lighting." This is one of the disadvantages that the gas company has to overcome, for there is at the present time no gas unit of as low a candle-power as the electric lamps used for this purpose, and the costs of the gas are compared to the costs of electricity without consideration of the difference in candle-power. As the lamps are lighted each night until 11 or 12 P.M., and in some instances all night, the electric companies, by reason of these long burning hours, are in a position to make a low rate for this class of business, but that it is possible to secure the business with gas has been proven by those companies that have actually secured the same.

If any big success is to be secured it is necessary for a lighting unit to be placed on the market, ornamental in appearance, of low maintenance cost and of fairly low candle-power.

It is also necessary for the gas companies to make rates for gas proportionate to the volume of this particular business, and they can not, as is often the case at the present time, hope to secure the business on the rates which apply to their smallest consumers, where a large number of lamps are required.

In addition to the profit from this form of lighting it unquestionably is of good advertising value to the gas company.

To our knowledge there is not manufactured at the present time gas lighting units that are entirely suitable to district improvement street lighting. Your Committee believes there is a demand for, and there should be, a full line of modern lamps of different sizes on the market, especially designed for street lighting business of this kind, and we believe that if such a line of appliances were placed on the market they would receive

the full co-operation of the commercial departments of the gas companies and gas companies would be able to gain a large proportion of the district improvement street lighting business.

MUNICIPAL STREET LIGHTING

As previously stated, prior to the introduction of the electric arc in 1880, streets were lighted almost exclusively by means of gas lamps with open flame burners of from 10 to 20 candle-power, used singly or in clusters. This lighting was displaced to a large extent because of the demand for greater street illumination which was supplied by the electric arc by reason of the greater intensity of the latter.

The introduction of the incandescent gas mantle about sixteen years ago placed the gas company in a much better condition to secure the street lighting business. The old types of lamps used with the open flame gas burner were displaced by attractive units, patented and especially designed to produce the highest possible efficiency with the incandescent mantle, at a low consumption of gas.

In order to stimulate and encourage the use of these new units, the companies manufacturing them entered into what was then a new line of business, the sole object of which was contracting for gas street lighting.

The extent to which gas is now used for street lighting throughout the United States can be judged from the fact that there are approximately 250,000 of these gas units maintained under contract with municipalities, and sharing with the electric units the appropriations made for that purpose. Each of these lamps, from the gas companies' standpoint, is a desirable consumer of a definite predetermined amount of gas per year, and the time of consumption, largely during the "off peak" periods. The gas for these units is automatically controlled to a definite hourly rate, and the lighting and extinguishing of the lamps is fixed by the lighting schedule conforming to that required by the municipality of approximately 4,000 hours per year.

The gas company receives for gas used for street lighting at the present time, in most instances, the same rate which applies to its smallest consumer, the company is not involved in any contractual relation with the municipality, on account of street lighting, and assumes no responsibility other than that of supplying gas to the lamp posts.

The street lighting situation today is principally controlled by the electric arc lamps and 60 candle-power gas lamps. The continual extension of electric conduits throughout the residential districts of our larger cities may make the Tungsten lamp a serious competitor to be dealt with in the future.

The maintenance charge for gas street lamps has been steadily reduced, by means of improved methods of operation and economic devices, to such a point that any further material reduction must be made in the cost of gas to these lamps by the gas companies.

It is a known fact that the efficiency of the incandescent mantle is established, and has not been materially increased within recent years, although by the introduction of artificial silk, mantles are stronger today than formerly, and also possess the desired quality of maintaining a high candle-power without deterioration. On the other hand, improvements are being made in the efficiency of electric filament lamps, and a new lamp having an efficiency of 5/10 of a watt per candle, it is expected will be available in the near future.

To successfully compete with these improvements it will be necessary to materially increase the efficiency of present gas lighting units, and as cost is a very essential item in procuring street lighting contracts, increased efficiency will have to be obtained without materially increasing the rate of gas consumption. The only known way by which this can be obtained is by raising the pressure of gas, increasing thereby, with improved units which are available at the present time, the efficiency more than twice that now obtained with low pressure gas units.

In the efforts to encourage the use of higher candle-power, low pressure gas units for street lighting purposes, a fixture

consisting of two inverted mantles was designed, which on a consumption of 5½ cubic feet per hour produces 150 candle-power. The increased yearly consumption, caused by this new unit of 8,000 cubic feet, at the current rates for gas, held back its advancement in the street lighting field most seriously, although after several years it has become recognized by some cities, which have seen the advantage of using it in place of the single 60 candle-power unit, and have thereby very materially raised the efficiency of the street lighting at an increased cost per unit not much above the actual cost for the increased amount of gas used.

In conclusion, it can be safely asserted:

First. That gas street lighting has increased since the introduction of the incandescent mantle and is now increasing.

Second. That electric companies are making every effort to extend their business in street lighting, by keeping their prices for current down as low as possible.

Third. That gas companies, if they are to be active competitors of electric companies for high candle-power street lighting, must first provide for lower prices for large consumptions, and possibly in the near future for higher gas pressures.

There is considerable difference of opinion among members of the committee as to how municipal street lighting should be handled, that is, whether through a special lighting company or by the gas company dealing directly with the municipality. The point cited in favor of a street lighting company handling this business, is that the gas company is not involved politically with the city in such a way as might injure their general business.

All the details of the securing of the contract and the troubles that may arise after it is obtained, are borne by the street lighting company. Some of the Committee are inclined to believe that if gas companies would directly attempt to secure gas street lighting business from the municipalities they would not be endangering their general business in any way. That the business is not affected by political wrangles to any

marked extent they believe is proven by the fact that the electric companies successfully handle the street lighting end of their business by dealing direct with the city.

It is not the desire of this Committee to show favor or discredit to either gas companies or equipment companies, but it mentions this difference in opinion because where such differences exist they will lead to a discussion of the subject which will result in the best method of handling this business.

Ornamental Post equipped with Single Mantle Upright Lamp.